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GB 0409226 A US 4761235 A US 4274958 A
US 3965013 A

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(54) **Water filtration apparatus**

(57) Water filtration apparatus comprises a solids settlement vessel 2, a sump 3 at the bottom of the vessel 2 for receiving settled solids and means 10 in the vessel or associated therewith for receiving water to be filtered and for reducing the rate of flow of the water, the means having an outlet exiting into the vessel 2 at or adjacent to the sump 3.

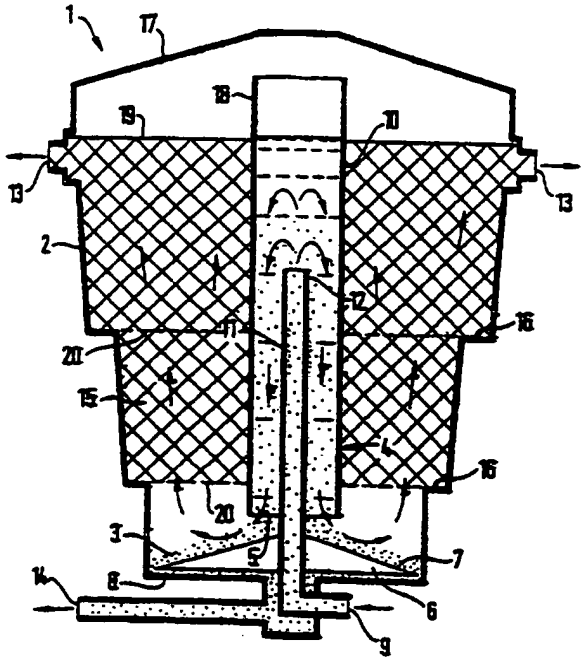

Fig. 1

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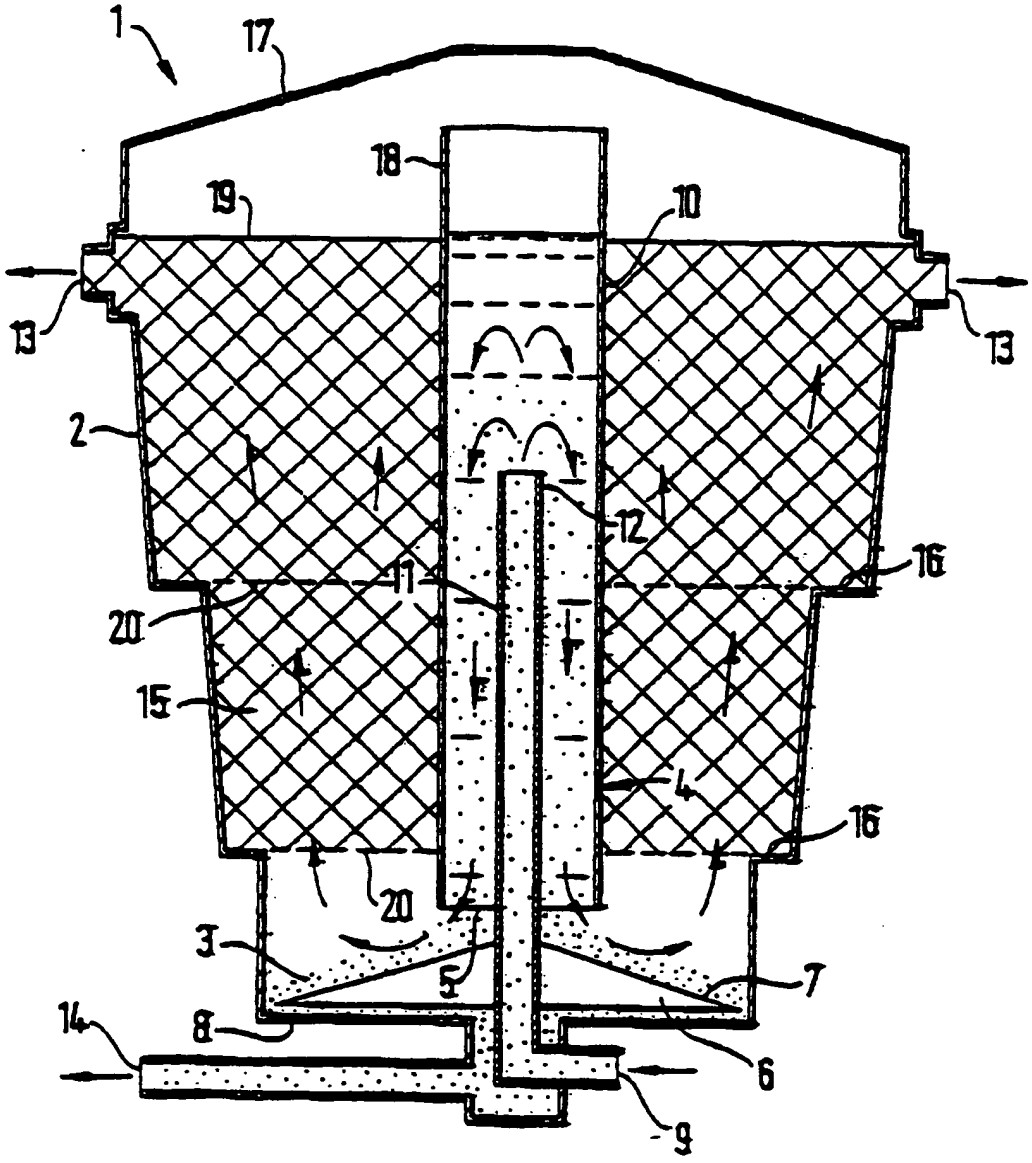

Fig. 1

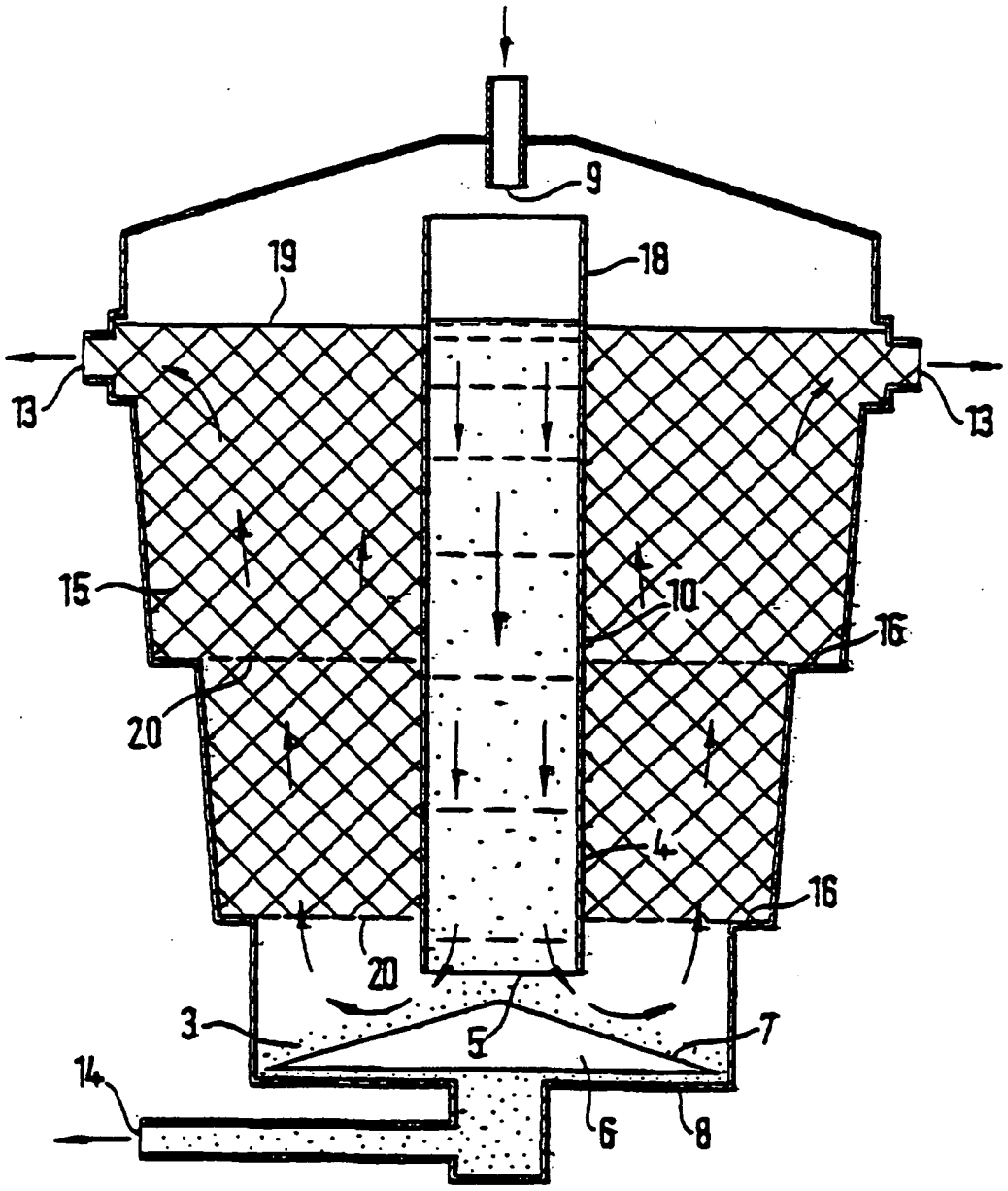

Fig. 2

TITLE: WATER FILTRATION APPARATUS

DESCRIPTION

The invention relates to water filtration apparatus more particularly, but not exclusively, for use in association with fish ponds.

It is known to provide water filtration apparatus for a fish pond comprising a solids settling tank.

It is an object of the invention to provide water filtration apparatus for use in association with a fish pond and which is efficient in operation and simple in construction.

According to the invention water filtration apparatus comprises a solids settlement vessel, a sump at the bottom of the vessel for receiving settled solids, means in the vessel or associated therewith for receiving water to be filtered and for reducing the rate of flow of the water,

the means having an outlet exiting into vessel at or adjacent to the sump.

Preferably, the outlet is arranged to discharge the water downwardly into the vessel. Preferably a downwardly directed baffle is disposed in the sump at a position below the outlet. Preferably the baffle presents a substantially conical surface to the outlet. The baffle may however be part spherical, parabolic or pyramidal in shape. Preferably the baffle is raised above the bottom of the sump.

Preferably the means for receiving water to be filtered and for reducing the rate of flow thereof comprises an entry portion extending substantially vertically of the vessel and discharging at its upper end into a downwardly extending intermediate portion extending substantially concentrically around the entry portion, the cross-sectional area of the intermediate portion being greater than that of the entry portion, and the intermediate portion terminating at its lower end at the outlet. The outlet may comprise a divergent section.

The vessel may be open-topped, and may have an outlet at its upper end. The vessel may comprise one or more perforated trays extending over substantially the whole of the cross-sectional area of the vessel for supporting filter media, e.g. for mechanical and/or biological and/or chemical filtration.

An outlet for settled solids may be provided in the sump.

The invention is diagrammatically illustrated, by way of example, in the accompanying drawings, in which:-

Figure 1 is a sectional side view of a first embodiment of water filtration apparatus for use in association with a fish pond, and

Figure 2 is a sectional side view of a second embodiment of water filtration apparatus for use in association with a fish pond.

Referring to Figure 1 of the drawings, a fish pond filter 1 comprises a solids settlement vessel 2 adapted to contain water to be filtered to a level indicated by reference 19 and which is generally square in plan view and provided with steps 16 whereby the width of the vessel increases from its base 8 to its top. The top of the vessel is open for access into the vessel, e.g. for maintenance, and is closed by a lid 17. The bottom of the vessel forms a sump 3 for receiving settled solids.

A water inlet pipe 9 extends into the vessel from a central position in its base 8 and has its major portion 11 extending generally vertically and its upper end 12 at a position midway between the base and top of the vessel.

The water inlet pipe 9 is surrounded, generally concentrically, by a receiver 4 which is in the form of a generally tubular open-ended intermediate vessel 10 with its axis upright and extending at its upper end 18 to a position above the waterline 19 and at its lower end forms an outlet 5 discharging into the interior of the vessel 2 near to its base 8. The outlet 5 is positioned to

discharge water downwardly against a baffle 6 having a conical upper face 7 positioned immediately above the base 8.

The vessel 2 is preferably filled with a filter medium 5 which is supported on apertured supports e.g. in the form of one or more perforated plates 20 which are supported on the shoulders formed by the steps 16 in the vessel.

One or more outlets 13 for filtered water are disposed immediately below the waterline 19 near to the top of the vessel. An outlet 14 for solids waste is provided at the sump 3 and under the control of a valve or the like (not shown).

The filter of Figure 2 is generally similar to that of Figure 1, but in this case the inlet water discharges into the receiver 4 in the vessel through an inlet 9 disposed in the lid 17.

In operation water to be filtered is pumped into the vessel 2 through the inlet pipe 9 and is slowed as it passes through the intermediate receiving chamber 4 which is of greater cross-sectional area than the inlet pipe 9. The water is slowed again as it exits from the intermediate chamber at 5 into the main chamber of the vessel and the slow moving water is then directed by the conical baffle 6 towards the sump 3 where the solids are deposited. Cleaned water exits from the outlets 13 near to the top of the vessel 2. The cleaned water may then be further treated e.g. by mechanical and/or biological and/or chemical filtration. When the filtration apparatus of the invention

is used as one of a series of water treatment steps, the outlet from the vessel can be arranged at any suitable position in the vessel.

The invention thus provides simple and effective water filtration apparatus.

CLAIMS

1. Water filtration apparatus comprising a solids settlement vessel, a sump at the bottom of the vessel for receiving settled solids, means in the vessel or associated therewith for receiving water to be filtered and for reducing the rate of flow of the water, the means having an outlet exiting into the vessel at or adjacent to the sump.

2. Water filtration apparatus according to claim 1, wherein the outlet is arranged to discharge the water downwardly into the vessel.

3. Water filtration apparatus according to claim 2, comprising a downwardly directed baffle disposed in the sump at a position below the outlet.

4. Water filtration apparatus according to claim 3, wherein the baffle presents a substantially conical surface to the outlet.

5. Water filtration apparatus according to claim 3 or claim 4, wherein the baffle is raised above the bottom of the sump.

6. Water filtration apparatus according to any preceding claim, comprising an inlet for water to be filtered and wherein the means for receiving water to be filtered and for reducing the rate of flow thereof comprises an intermediate vessel the cross-sectional area of which is greater than that of the water inlet, the intermediate vessel terminating at its lower end at the outlet.

7. Water filtration apparatus according to claim 6, wherein the water inlet comprises an entry portion

extending substantially vertically of the vessel and discharging at its upper end into the intermediate vessel.

8. Water filtration apparatus according to any preceding claim, wherein the outlet comprises a divergent section.

9. Water filtration apparatus according to any preceding claim, wherein the vessel has an outlet for filtered water at its upper end.

10. Water filtration apparatus according to any preceding claim, wherein the vessel comprises at least one apertured support extending over substantially the whole of the cross-sectional area of the vessel for supporting a filter.

11. Water filtration apparatus according to any preceding claim, comprising an outlet for settled solids in the sump.

12. Water filtration apparatus substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

The Patent Office

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Claims searched: 1 to 12

Examiner: Mike Henderson
Date of search: 12 September 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B1D (DPAA DPAB DPAC DPAD DPFC DPFE DPGA DPGC DPGX)

Int Cl (Ed.6): B01D 21/00 21/02 21/24

Other: ONLINE:WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 409226	(VAN THIEL DE VRIES) (Whole specification relevant)	1,2,6,8,9 & 11
X	US 4761235	(HAENTJENS) (Col 2 ll 40 - 46 particularly relevant)	1,2,6,8,9 & 11
X	US 4274958	(FITCH) (Col 3 ll 17 - 36 particularly relevant)	1,2,6,9 & 11
X	US 3965013	(JACKSON) (Col 3 ll 8 - 18 particularly relevant)	1 to 6,8,9 & 11

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.